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GENERAL ELECTRIC COMPANY (PCPI)
C/O FLETCHER YODER
P. O. BOX 692289
HOUSTON, TX 77269-2289

EXAMINER	
THANGAVELU, KANDASAMY	
ART UNIT	**PAPER NUMBER**
2123	

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Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/897,556	OSBORN ET AL.	
	Examiner	Art Unit	
	Kandasamy Thangavelu	2123	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *22 December 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-4,12-28,36-46,48-53 and 55-57* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-4,12-28,36-46,48-53 and 55-57* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *15 October 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Introduction

1. This communication is in response to the Applicants' Response mailed on December 22, 2005. Claims 36, 38, 50, 55 and 56 were amended. Claims 7-10 and 31-34 were canceled. Claims 1-4, 12-28, 36-46, 48-53 and 55-57 of the application are pending. This office action is made final.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains.

3. The factual inquiries set forth in *Graham* v. *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

4. Claims 1-3, 12-14, 25-27, 39-41, 50-52 and 55 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of **Weinstock et al.** (U.S. Patent 6,223,143), and further in view of **Goyal et al.** (U.S. Patent 5,625,575).

4.1 **Willoughby et al.** teaches reliability of electrical distribution networks. Specifically, as per claim 1, **Willoughby et al.** teaches an interactive graphics-based system for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

a processor for executing instructions, a memory for storing instructions and data, a display device and an interactive graphics-based tool (Fig. 8); comprising:

an interactive selection component that provides a plurality of options for analyzing the hierarchical representation (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50); and

a reliability analysis component, responsive to the interactive selection component, that performs a reliability analysis (Abstract, L1-5 and L9-27; CL1, 43-50; CL1, L55-57; CL2, L33-35).

Willoughby et al. does not expressly teach a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7,

L59 to CL8, L9; Fig. 22). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation because that would provide a reliability and risk analysis system with an easily understood and generated hierarchical decomposition of the systems (CL2, L66-67).

Willoughby et al. does not expressly teach a reliability analysis component, responsive to the hierarchical representation component that performs a reliability analysis at any level of the hierarchical representation. **Weinstock et al.** teaches a reliability analysis component, responsive to the hierarchical representation component that performs a reliability analysis at any level of the hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Weinstock et al.** that included a reliability analysis component, responsive to the hierarchical representation component that performs a reliability analysis at any level of the hierarchical representation because that would assess reliability and risk at failure mode, system, subsystem and element levels based on historical and user supplied quantifications of failure modes, event sequences, system decomposition and operating times (CL3, L4-7).

Willoughby et al. and **Weinstock et al.** do not expressly teach a visualization component that provides a movie mode display of the reliability analysis. **Goyal et al.** teaches a visualization component that provides a movie mode display of the reliability analysis (CL1, L8-

9; CL14, L1-4; CL30, L17-26; CL31, L40-45). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** and **Weinstock et al.** with the system of **Goyal et al.** that included a visualization component that provided a movie mode display of the reliability analysis, because that would allow presenting the results of the analysis in the form of an interactive animation on a computer display terminal; the animation could be recorded on a video tape; results could be visualized later in a movie palyback mode; the rate of frame display could be controlled at various speeds, for example, in slow motion; the interactive visualization capabilities would provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of interest; with the movie playback capability, real time visualization would be obtained as would be slow motion or fast motion palyback (CL14, L1-4; CL30, L17-26; CL31, L40-45).

4.2 As per claim 2, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 1. **Willoughby et al.** and **Goyal et al.** do not expressly teach that the hierarchical representation generated by the hierarchical representation component takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node. **Weinstock et al.** teaches that the hierarchical representation generated by the hierarchical representation component takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62).

4.3 As per claim 3, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 2. **Willoughby et al.** teaches the plurality of options provided by the interactive selection component (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50). **Willoughby et al.** and **Goyal et al.** do not expressly teach that the plurality of options provided by the interactive selection component comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes. **Weinstock et al.** teaches that the plurality of options provided by the interactive selection component comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes (Fig. 5C, Item 535 and 537; Fig. 6; Fig. 7; CL10, L45-62).

4.4 As per claim 12, **Willoughby et al.** teaches a graphics-based system for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

a processor for executing instructions, a memory for storing instructions and data, a display device and a graphics-based tool (Fig. 8).

Willoughby et al. does not expressly teach means for organizing the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches means for organizing the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22).

Willoughby et al. does not expressly teach means for providing a plurality of options for analyzing the hierarchical representation. **Weinstock et al.** teaches means for providing a plurality of options for analyzing the hierarchical representation (Figs. 10, 12, 13, 14A, 16, 18 and 21).

Willoughby et al. does not expressly teach means, responsive to the organizing means and the providing means, for performing a reliability analysis at any level of the hierarchical representation. **Weinstock et al.** teaches means, responsive to the organizing means and the providing means, for performing a reliability analysis at any level of the hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62).

Willoughby et al. and **Weinstock et al.** do not expressly teach means for generating a visualization of the reliability analysis in a movie mode display. **Goyal et al.** teaches means for generating a visualization of the reliability analysis in a movie mode display (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45).

4.5 As per claim 13, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 12. **Willoughby et al.** and **Goyal et al.** do not expressly teach that the hierarchical representation generated by the organizing means takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node. **Weinstock et al.** teaches that the hierarchical representation generated by the organizing means takes the form of a tree structure wherein the system and plurality of subsystems and

components are represented in the tree structure by a node (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62).

4.6 As per claim 14, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 13. **Willoughby et al.** teaches the plurality of options provided by the providing means (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50). and **Goyal et al.** do not expressly teach that the plurality of options provided by the providing means comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes. **Weinstock et al.** teaches that the plurality of options provided by the providing means comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes (Fig. 5C, Item 535 and 537; Fig. 6; Fig. 7; CL10, L45-62).

4.7 As per Claims 25-27, these are rejected based on the same reasoning as Claims 1-3, and 7-9 supra. Claims 25-27 are computer-implemented method claims reciting the same limitations as Claims 1-3, as taught throughout by **Willoughby et al., Weinstock et al.** and **Goyal et al.**

4.8 As per claim 39, **Willoughby et al.** teaches a computer-implemented method for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising computer-implemented steps for:

prompting the user to select from a plurality of analyzing options (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50);

in response to the user selection, performing a reliability analysis (Abstract, L1-5 and L9-27; CL1, 43-50; CL1, L55-57; CL2, L33-35).

Willoughby et al. does not expressly teach prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22).

Willoughby et al. does not expressly teach in response to the user selection, performing a reliability analysis at any level of the hierarchical representation. **Weinstock et al.** teaches in response to the user selection, performing a reliability analysis at any level of the hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62).

Willoughby et al. and **Weinstock et al.** do not expressly teach providing a visualization of the reliability analysis in a movie mode display. **Goyal et al.** teaches providing a visualization of the reliability analysis in a movie mode display (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45).

4.9 As per claim 40, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the method of claim 39. **Willoughby et al.** and **Goyal et al.** do not expressly teach that the hierarchical representation takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node. **Weinstock et al.** teaches that the

hierarchical representation takes the form of a tree structure wherein the system and plurality of subsystems and components are represented in the tree structure by a node (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62).

4.10 As per claim 41, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the method of claim 40. **Willoughby et al.** teaches the plurality of options provided by the interactive selection component (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50). **Willoughby et al.** and **Goyal et al.** do not expressly teach that the plurality of options provided by the interactive selection component comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes. **Weinstock et al.** teaches that the plurality of options provided by the interactive selection component comprises at least one of moving about the hierarchical representation, selecting a node and defining a group of nodes (Fig. 5C, Item 535 and 537; Fig. 6; Fig. 7; CL10, L45-62).

4.11 As per Claims 50-52 and 55 these are rejected based on the same reasoning as Claims 31-33 and 39, supra. Claims 50-52 and 55 are computer-readable medium claims reciting the same limitations as Claims 31-33 and 39, as taught throughout by **Willoughby et al., Weinstock et al.** and **Goyal et al.**

5. Claims 4, 15, 19-22, 24, 28, 42 and 53 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of **Weinstock et al.** (U.S.

Patent 6,223,143) and **Goyal et al.** (U.S. Patent 5,625,575), and further in view of **Spira et al.** (U.S. Patent Application 2003/0172002).

5.1 As per claim 4, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 1. **Willoughby et al.** teaches that the reliability analysis component performs at least one of a reliability prediction (CL1, L45-47; Abstract, L1-5 and L18-20; CL1, L55-57; CL3, L33-35).

Willoughby et al. and **Goyal et al.** do not expressly teach that the reliability analysis component performs at least one of a statistical analysis. **Weinstock et al.** teaches that the reliability analysis component performs at least one of a statistical analysis (CL2, L2-9).

Willoughby et al., Weinstock et al. and **Goyal et al.** do not expressly teach that the reliability analysis component performs at least one of a life cycle cost analysis. **Spira et al.** teaches that the reliability analysis component performs at least one of a life cycle cost analysis (Page 2, Para 0031; Page 2, Para 0032). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al., Weinstock et al.** and **Goyal et al.** with the system of **Spira et al.** that included the reliability analysis component performing at least one of a life cycle cost analysis because that would enhance the system owner's financial system results (profit) and lower the cost over the life time of the system, through a proactive based maintenance approach (Page 2, Para 0031; Page 2, Para 0032).

Willoughby et al., Weinstock et al. and **Goyal et al.** do not expressly teach that the reliability analysis component performs at least one of a maintenance projection. **Spira et al.**

teaches that the reliability analysis component performs at least one of a maintenance projection (Fig. 12, Items 504 and 506; Fig. 18; Page 1, Para 0001; Page 10, Para 0137).

Willoughby et al., Weinstock et al. and **Goyal et al.** do not expressly teach that the reliability analysis component performs at least one of a inventory forecasting. **Spira et al.** teaches that the reliability analysis component performs at least one of a inventory forecasting (Fig. 17, Item 106; Page 10, Para 0134).

5.2 As per claim 15, **Willoughby et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 12. **Willoughby et al.** teaches that the reliability analysis means performs at least one of a reliability prediction (CL1, L45-47; Abstract, L1-5 and L18-20; CL1, L55-57; CL3, L33-35).

Willoughby et al. and **Goyal et al.** do not expressly teach that the reliability analysis means performs at least one of a statistical analysis. **Weinstock et al.** teaches that the reliability analysis means performs at least one of a statistical analysis (CL2, L2-9).

Willoughby et al., Weinstock et al. and **Goyal et al.** do not expressly teach that the reliability analysis means performs at least one of a life cycle cost analysis. **Spira et al.** teaches that the reliability analysis means performs at least one of a life cycle cost analysis (Page 2, Para 0031; Page 2, Para 0032).

Willoughby et al., Weinstock et al. and **Goyal et al.** do not expressly teach that the reliability analysis means performs at least one of a maintenance projection. **Spira et al.** teaches that the reliability analysis means performs at least one of a maintenance projection (Fig. 12, Items 504 and 506; Fig. 18; Page 1, Para 0001; Page 10, Para 0137).

Willoughby et al., Weinstock et al. and **Goyal et al.** do not expressly teach that the reliability analysis means performs at least one of a inventory forecasting. **Spira et al.** teaches that the reliability analysis means performs at least one of a inventory forecasting (Fig. 17, Item 106; Page 10, Para 0134).

5.3 As per claim 19, **Willoughby et al.** teaches a system for performing an analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

an interactive graphics-based tool for performing a reliability analysis on the system in accordance with the plurality of service data (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); the interactive graphics-based tool comprising:

an interactive selection component that provides a plurality of options for analyzing the hierarchical representation (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50); and

a first computing unit configured to serve the data repository and the interactive graphics-based tool (Fig. 8; Fig. 9, Item s 940 and 855).

Willoughby et al. does not expressly teach a data repository containing a plurality of service data for the system. **Spira et al.** teaches a data repository containing a plurality of service data for the system (Page 2, Para 0021).

Willoughby et al. and **Spira et al.** do not expressly teach a hierarchical representation component that organizes the system and the plurality of subsystems and components into a

hierarchical representation. **Weinstock et al.** teaches a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22).

Willoughby et al. and **Spira et al.** do not expressly teach a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation. **Weinstock et al.** teaches a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation (CL2, L2-9).

Willoughby et al., Spira et al. and **Weinstock et al.** do not expressly teach a visualization component that provides a movie mode display of the statistical analysis. **Goyal et al.** teaches a visualization component that provides a movie mode display of the statistical analysis (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45).

5.4 As per claim 20, **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.** teach the system of claim 19. **Willoughby et al., Weinstock et al.** and **Goyal et al.** do not expressly teach that the data repository stores historical failure data for the system. **Spira et al.** teaches that the data repository stores historical failure data for the system (Page 2, Para 0021).

5.5 As per claim 21, **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.** teach the system of claim 19. **Willoughby et al., Goyal et al.** and **Spira et al.** do not expressly

teach a simulator that simulates the reliability of the plurality of service data in accordance with the statistical model. **Weinstock et al.** teaches a simulator that simulates the reliability of the plurality of service data in accordance with the statistical model (Fig. 5C; CL2, L2-9; Fig. 16; CL16, L44-59; CL18, L37-59).

5.6 As per claim 22, **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.** teach the system of claim 19. **Willoughby et al.** teaches an expert system that assists the interactive graphics-based tool in performing the reliability analysis (Fig. 9, Item 850; CL2, L40-45; Cl14, L37-43; CL15, L14-22).

5.7 As per claim 24, **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.** teach the system of claim 19. **Willoughby et al., Weinstock et al.** and **Goyal et al.** do not expressly teach a second computing unit configured to interact with the data repository and the interactive graphics-based tool served from the first computing unit over a network. **Spira et al.** teaches a second computing unit configured to interact with the data repository and the interactive graphics-based tool served from the first computing unit over a network (Page 2, Para 0021; Page 3, Para 0037; Fig. 2; Page 3, Para 0038; Page 9, Para 0117).

5.8 As per Claims 28 and 42, these are rejected based on the same reasoning as Claims 4 and 10, supra. Claims 28 and 42 are method claims reciting the same limitations as Claims 4 and 10, as taught throughout by **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.**

5.9 As per Claim 53 it is rejected based on the same reasoning as Claim 4, supra. Claim 53 is a computer-readable medium claim reciting the same limitations as Claims 4, as taught throughout by **Willoughby et al., Weinstock et al., Goyal et al.** and **Spira et al.**

6. Claims 16, 17, 23, 36, 38, 44-46, 48, 49 and 57 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of **Spira et al.** (U.S. Patent Application 2003/0172002), **Wegerich et al.** (U.S. Patent Application 2002/0183971) and **Weinstock et al.** (U.S. Patent 6,223,143), and further in view of and **Goyal et al.** (U.S. Patent 5,625,575).

6.1 As per claim 16, **Willoughby et al.** teaches a system for performing an analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

a processor for executing instructions, a memory for storing instructions and data, a display device (Fig. 8);

an interactive graphics-based tool for performing the user specified reliability analysis on the system in accordance with the plurality of service data (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); the interactive graphics-based tool comprising:

an interactive selection component that provides a plurality of options for analyzing the hierarchical representation (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50).

Willoughby et al. does not expressly teach a data repository containing a plurality of service data for the system. **Spira et al.** teaches a data repository containing a plurality of service data for the system (Page 2, Para 0021).

Willoughby et al. teaches a user specified reliability analysis selection (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50). **Willoughby et al.** and **Spira et al.** do not expressly teach an interactive data preprocessor that preprocesses the plurality of service data in accordance with a user specified reliability analysis selection. **Wegerich et al.** teaches an interactive data preprocessor that preprocesses the plurality of service data in accordance with a user specified reliability analysis selection (Fig. 1, Item 110; Page 2, Para 0033; Page 3, Para 0034). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** and **Spira et al.** with the system of **Wegerich et al.** that included an interactive data preprocessor that preprocesses the plurality of service data in accordance with a user specified reliability analysis selection because that would allow using historical service data to learn normal states of operation and use the data for diagnostics (Page 3, Para 0037 and Page 6, Para 0062).

Willoughby et al., Spira et al. and **Wegerich et al.** do not expressly teach a hierarchical representation component that organizes the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches a hierarchical representation component that organizes the system and the plurality of subsystems and

components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22).

Willoughby et al., Spira et al. and **Wegerich et al.** do not expressly teach a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation. **Weinstock et al.** teaches a statistical analysis component, responsive to the hierarchical representation component and the interactive selection component, that performs a statistical analysis at any level of the hierarchical representation (CL2, L2-9).

Willoughby et al., Spira et al., Wegerich et al. and **Weinstock et al.** do not expressly teach a visualization component that provides a movie mode display of the statistical analysis. **Goyal et al.** teaches a visualization component that provides a movie mode display of the statistical analysis (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45).

6.2 As per claim 17, **Willoughby et al., Spira et al., Wegerich et al., Weinstock et al.** and **Goyal et al.** teach the system of claim 16. **Willoughby et al.** teaches an expert system that assists the interactive graphics-based tool in performing the reliability analysis (Fig. 9, Item 850; CL2, L40-45; Cl14, L37-43; CL15, L14-22).

6.3 As per claim 23, **Willoughby et al., Weinstock et al., Spira et al.** and **Goyal et al.** teach the system of claim 19. **Willoughby et al., Weinstock et al., Spira et al.** and **Goyal et al.** do not expressly teach a data preprocessor that preprocesses the plurality of service data. **Wegerich**

et al. teaches a data preprocessor that preprocesses the plurality of service data (Fig. 1, Item 110; Page 2, Para 0033; Page 3, Para 0034).

6.4 As per claim 36, **Willoughby et al.** teaches method for performing a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

providing an interactive graphics-based tool for performing the user specified reliability analysis on the system in accordance with the plurality of service data (Abstract, L1-5 and L9-27; Fig. 12E; CL1, L40-50; CL1, L55-57; CL2, L33-35); and

that the interactive graphics-based tool is configured to provide a plurality of options for analyzing the hierarchical representation (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50).

Willoughby et al. does not expressly teach storing a plurality of service data for the system. **Spira et al.** teaches storing a plurality of service data for the system (Page 2, Para 0021).

Willoughby et al. and **Spira et al.** do not expressly teach preprocessing the plurality of service data in accordance with a user specified reliability analysis selection. **Wegerich et al.** teaches preprocessing the plurality of service data in accordance with a user specified reliability analysis selection (Fig. 1, Item 110; Page 2, Para 0033; Page 3, Para 0034).

Willoughby et al., Spira et al. and **Wegerich et al.** do not expressly teach that the interactive graphics-based tool is configured to organize the system and the plurality of

subsystems and components into a hierarchical representation. **Weinstock et al.** teaches that the interactive graphics-based tool is configured to organize the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22).

Willoughby et al., Spira et al. and **Wegerich et al.** do not expressly teach that the interactive graphics-based tool is configured to perform a reliability analysis at any level of the hierarchical representation. **Weinstock et al.** teaches that the interactive graphics-based tool is configured to perform a reliability analysis at any level of the hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62).

Willoughby et al., Spira et al., Wegerich et al. and **Weinstock et al.** do not expressly teach providing a visualization of the reliability analysis as a movie mode display. **Goyal et al.** teaches providing a visualization of the reliability analysis as a movie mode display (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45).

6.5 As per claim 38, **Willoughby et al., Spira et al., Wegerich et al., Weinstock et al.** and **Goyal et al.** teach the method of claim 36. **Willoughby et al., Wegerich et al., Weinstock et al.** and **Goyal et al.** do not expressly teach performing a simulation, wherein the simulating predicts life cycle events and costs associated with each event. **Spira et al.** teaches performing a simulation, wherein the simulating predicts life cycle events and costs associated with each event (Page 2, Para 0031; Page 2, Para 0032).

6.6 As per claim 44, **Willoughby et al., Spira et al., Wegerich et al.** and **Goyal et al.** teach the method of claim 43. **Willoughby et al., Spira et al., Wegerich et al.** and **Goyal et al.** do not expressly teach that the performing of the user specified reliability analysis comprises prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation. **Weinstock et al.** teaches that the performing of the user specified reliability analysis comprises prompting the user to organize the system and the plurality of subsystems and components into a hierarchical representation (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Item 62; Fig. 5B, Item 531; Fig. 6; CL4, L6-8; CL7, L59 to CL8, L9; Fig. 22).

6.7 As per claim 45, **Willoughby et al., Spira et al., Wegerich et al., Goyal et al.** and **Weinstock et al.** teach the method of claim 44. **Willoughby et al.** teaches that the performing of the user specified reliability analysis comprises prompting the user to select from a plurality of analyzing options (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50).

6.8 As per claim 46, **Willoughby et al., Spira et al., Wegerich et al., Goyal et al.** and **Weinstock et al.** teach the method of claim 45. **Willoughby et al., Spira et al., Wegerich et al., Goyal et al.** do not expressly teach that the performing of the user specified reliability analysis comprises performing a reliability analysis at any level of the hierarchical representation in response to the user selection. **Weinstock et al.** teaches that the performing of the user specified reliability analysis comprises performing a reliability analysis at any level of the hierarchical representation in response to the user selection. (Abstract, L1-2, L8-10 and L13-17; Fig. 5A, Fig. 5B and Fig. 6; CL7, L59 to CL8, L9; CL10, L26-34; CL10, L45-62).

6.9 As per claim 48, **Willoughby et al., Spira et al., Wegerich et al.** and **Goyal et al.** teach the method of claim 43. **Willoughby et al., Spira et al., Wegerich et al.** and **Goyal et al.** do not expressly teach performing a simulation of the reliability of the plurality of service data in accordance with the statistical model. **Weinstock et al.** teaches performing a simulation of the reliability of the plurality of service data in accordance with the statistical model (Fig. 5C; CL2, L2-9; Fig. 16; CL16, L44-59; CL18, L37-59).

6.10 As per claim 49, **Willoughby et al., Spira et al., Wegerich et al., Goyal et al.** and **Weinstock et al.** teach the method of claim 48. **Willoughby et al., Spira et al., Wegerich et al.** and **Goyal et al.** do not expressly teach simulating the reliability of the plurality of service data in accordance with the statistical model. **Weinstock et al.** teaches simulating the reliability of the plurality of service data in accordance with the statistical model (Fig. 5C; CL2, L2-9; Fig. 16; CL16, L44-59; CL18, L37-59).

Willoughby et al., Wegerich et al., Goyal et al. and **Weinstock et al.** do not expressly teach predicting life cycle events and costs associated with each event. **Spira et al.** teaches predicting life cycle events and costs associated with each event (Page 2, Para 0031; Page 2, Para 0032).

6.11 As per Claim 57, it is rejected based on the same reasoning as Claim 48, supra. Claim 57 is a computer-readable medium claim reciting the same limitations as Claims 48, as taught

throughout by **Willoughby et al., Spira et al., Wegerich et al., Goyal et al.** and **Weinstock et al.**

7. Claims 18 and 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of **Weinstock et al.** (U.S. Patent 6,223,143), and further in view of **Spira et al.** (U.S. Patent Application 2003/0172002), **Wegerich et al.** (U.S. Patent Application 2002/0183971), **Goyal et al.** (U.S. Patent 5,625,575), **Gross et al.** (U.S. Patent 5,774,379) and **Cook** (U.S. Patent 6,546,378).

7.1 As per claim 18, **Willoughby et al., Weinstock et al., Spira et al., Goyal et al.** and **Wegerich et al.** teach the system of claim 16. **Willoughby et al., Weinstock et al., Spira et al., Goyal et al.** and **Wegerich et al.** do not expressly teach that the data preprocessor performs at least one of determining censoring times, filtering data and segmenting data. **Gross et al.** that the data preprocessor performs at least one of determining censoring times and filtering data (CL10, L46-51). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Gross et al.** that included the data preprocessor performing at least one of determining censoring times and filtering data because that would allow sensing slow degradation that occurred over a long period in the presence of noisy background (C103, L56-65).

Willoughby et al., Weinstock et al., Spira et al., Goyal et al. and **Wegerich et al.** do not expressly teach that the data preprocessor performs at least one of determining censoring times and segmenting data. **Cook** teaches that the data preprocessor performs at least one of

determining censoring times and segmenting data (CL7, L10-13). It would have been obvious to one of ordinary skill in the art at the time of Applicants' invention to modify the system of **Willoughby et al.** with the system of **Cook** that included the data preprocessor performing at least one of determining censoring times and segmenting data because predictions could be made from interpretation of data segments (CL9, L63-65); and data segments could be used with classification modules to generate classifications (CL7, L10-13).

7.2 As per claim 37, **Willoughby et al., Spira et al., Weinstock et al., Wegerich et al.** and **Goyal et al.** teach the method of claim 36. **Willoughby et al., Spira et al., Weinstock et al., Wegerich et al.** and **Goyal et al.** do not expressly teach that the preprocessing comprises performing at least one of determining censoring times, filtering data and segmenting data. **Gross et al.** that the preprocessing comprises performing at least one of determining censoring times and filtering data (CL10, L46-51).

Willoughby et al., Spira et al., Weinstock et al., Wegerich et al., Goyal et al. and **Gross et al.** do not expressly teach that the preprocessing comprises performing at least one of determining censoring times and segmenting data. **Cook** teaches that the preprocessing comprises performing at least one of determining censoring times and segmenting data (CL7, L10-13).

8. Claims 43 and 56 are rejected under 35 U.S.C. 103(a) as being unpatentable over **Willoughby et al.** (U.S. Patent 6,549,880) in view of **Spira et al.** (U.S. Patent Application

2003/0172002), and further in view of **Wegerich et al.** (U.S. Patent Application 2002/0183971) and **Goyal et al.** (U.S. Patent 5,625,575).

8.1 As per claim 43, **Willoughby et al.** teaches a method for enabling a user to perform a reliability analysis on a system having a plurality of subsystems and a plurality of components within each subsystem (Abstract, L1-5 and L9-27; Fig. 9, Item 940; Figs. 10-12I; CL1, L40-50; CL3, L33-35); comprising:

prompting the user to specify a reliability analysis selection (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50);

performing the user specified reliability analysis (Abstract, L1-5 and L9-27; CL1, 43-50; CL1, L55-57; CL2, L33-35).

Willoughby et al. does not expressly teach storing a plurality of service data for the system. **Spira et al.** teaches storing a plurality of service data for the system (Page 2, Para 0021).

Willoughby et al. teaches a user specified reliability analysis selection (Abstract, L9-17 and L20-23; Fig. 12E; CL1, L40-50). **Willoughby et al.** and **Spira et al.** do not expressly teach preprocessing the plurality of service data in accordance with the user specified reliability analysis selection. **Wegerich et al.** teaches preprocessing the plurality of service data in accordance with the user specified reliability analysis selection (Fig. 1, Item 110; Page 2, Para 0033 ; Page 3, Para 0034).

Willoughby et al., Spira et al. and **Wegerich et al.** do not expressly teach providing a visualization of the reliability analysis as a movie mode display. **Goyal et al.** teaches providing a visualization of the reliability analysis as a movie mode display (CL1, L8-9; CL14, L1-4; CL30, L17-26; CL31, L40-45).

8.2 As per Claim 56, it is rejected based on the same reasoning as Claim 43, supra. Claim 56 is a computer-readable medium claim reciting the same limitations as Claims 43, as taught throughout by **Willoughby et al., Wegerich et al., Spira et al.** and **Goyal et al.**

Response to Arguments

9. As per the applicants' argument that "Goyal does not describe any reliability analysis whatsoever; Goyal, instead teaches the use of a movie mode-like display of parts; such displays of parts were commonplace for various reasons—such as for part and assembly visualization; however, the visualization of the results of reliability analysis is wholly different both in its nature and in the type of data visualized; prior to the invention, it was not known in the art to present the reliability analysis in movie mode; none of the cited art teaches or in any way suggests doing so; hence, even if combined, the references would not teach all the recitation of the claims, particularly the movie mode display of reliability analysis in conjunction with the other recited elements; the references cannot be fairly combined because Goyal does not describe any reliability analysis whatsoever; one skilled in the art will not be motivated to use the movie mode display of parts as described in Goyal to present the reliability analysis in movie mode;

there is no suggestion to combine the cited reference absent the present application; the only possible suggestion the Examiner can find is from the application itself; when prior art references require a selected combination to render obvious a subsequent invention, there must be some reason for the combination other than the hindsight gained from the invention itself, i.e., something in the prior art as a whole must suggest the desirability, and thus the obviousness, of making the combination; one cannot use hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention; none of the references suggests the combination relied upon by the Examiner or a motivation for such a combination; accordingly, the applicants believe that the combination is not obvious to one skilled in the art and the Examiner is using hindsight reconstruction to pick and choose among isolated disclosures in the prior art to deprecate the claimed invention", the Examiner respectfully disagrees.

Goyal et al. teaches modeling and simulation; and modeling of the interaction of rigid bodies (CL1, 8-10); the simulation program consists of a dynamics module that formulates the governing equations of the system and estimates the contact forces and other loads (CL13, L43-48); and a geometry module that models the mass, shape and inertial attributes of each body (CL13, L52-53); the geometry module also provides a display system that renders the results of the simulation in the form of interactive animation on a computer display terminal (CL14, L1-4); the animation can be automatically recorded on a video tape; results can be visualized later in a movie palyback mode; the rate of frame display can be controlled at various speeds, for example, in slow motion (CL30, L16-26); the interactive visualization capabilities provide a convenient user interface with greater flexibility for focusing on particular objects or particular areas of

interest; with the movie playback capability, real time visualization is obtained as is slow motion or fast motion palyback (CL31, L40-45).

The Examiner takes the position that **Goyal et al.** teaches presenting the simulation results on a videotape and then viewing the tape later at various controlled speeds. Simulation is solving the mathematical model of a system on a computer and producing the results. The results can be presented on a display screen for the user to see or can be recorded on a videotape to play later and analyze the results. Reliability analysis is very similar to simulation since it uses the mathematical models to compute some values and generate the outputs. Reliability analysis produces probability charts and outputs similar to the probability charts and outputs produced by any other simulation. The applicants have claimed in claims 21, 38, 48, 49 and 56 that the reliability analysis involves simulation. If so, one of ordinary skill in the art will use the teachings of **Goyal et al.** to record the reliability simulation outputs on a video tape and play them later in a movie mode for the reasons presented in Claim 1.

Conclusion

ACTION IS FINAL

10. Applicant's arguments with respect to claim rejections under 35 USC § 103 (a) are not persuasive. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

11. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. Kandasamy Thangavelu whose telephone number is 571-272-3717. The examiner can normally be reached on Monday through Friday from 8:00 AM to 5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mr. Paul Rodriguez, can be reached on 571-272-3753. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to TC 2100 Group receptionist: 571-272-2100.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

K. Thangavelu
Art Unit 2123
February 23, 2006

Paul L. Rodriguez
Primary Examiner
Art Unit 2125

3/2/06